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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/772,858      | 01/31/2001  | Akifumi Kamijima     | 033211-002          | 2102             |

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EXAMINER

OLSEN, ALLAN W

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1763

DATE MAILED: 09/15/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/772,858

Applicant(s)

KAMIJIMA, AKIFUMI

Examiner

Allan W. Olsen

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13-16 and 22-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 13 and 22 recite " wherein said at least one strippable film is an insulating organic film and a conductive film formed on said insulating organic film. The examiner seeks clarification regarding whether or not there is necessarily a distinction between the thin film of claims 10 and 19 that is formed upon the strippable film, and the conductive film of claims 13 and 22 that is formed upon said insulating organic film.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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**Claims 10, 11, 13, 15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Morimoto et al. in J. Vac. Sci. Technol. B, vol. 5 (1) (hereinafter, Morimoto).**

Morimoto teaches patterning a layer of PMMA with a focused ion beam, then depositing a layer of metal over the patterned PMMA before removing the patterned PMMA. See section II B. Fabrication process and figure 1.

**Claim 1, 8 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5,316, 617 issued to Kawabe et al. (hereinafter, Kawabe).**

Kawabe teaches using an ion beam to pattern a layer of PERMALLOY (28) and to pattern an underlying layer of alumina (26). Kawabe teaches that layer 28 is then removed. See figures 9C-9E and column 9, lines 23-45.

**Claims 1, 8 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 4,592,8017 issued to Hara et al. (hereinafter, Hara).**

Hara teaches using an ion beam to pattern a layer of alumina (27) and to pattern an underlying layer of PERMALLOY (23). Hara teaches that layer 27 can then be removed with phosphoric acid. See figures column 5, lines 46-66.

**Claims 1, 8-10, 17-19, 26 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5,506,197 issued to Nakamura et al. (hereinafter, Nakamura).**

Nakamura teaches depositing a strippable SiO<sub>2</sub> film (15) upon a Au layer (14) (figure 3D). Nakamura teaches using a focused ion beam to pattern the SiO<sub>2</sub> layer and the Au layer (figure 3E and column 10, lines 38-54). In a subsequent step, Nakamura teaches removing the SiO<sub>2</sub> layer (column 11, line 25). However, before removing the patterned SiO<sub>2</sub>, Nakamura teaches depositing an oxide layer (10) and a superconducting channel (20) over the SiO<sub>2</sub> layer (figure 3G).

**Claims 1, 2, 8, 10, 11, 17, 19, 20 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent 6,304,784 issued to Allee et al. (hereinafter, Allee).**

Allee teaches patterning a strippable resist layer (steps 502 - 504 of figure 5). Allee teaches depositing metallic layers onto the patterned resist layer and then removing the patterned resist layer (steps 506-508 of figure 5). Allee teaches depositing an insulating layer and then depositing a resist layer onto the insulating layer (steps 510-512 of figure 5). Allee teaches using a focused ion beam to etch both the resist layer and the underlying insulation layer (steps 514-516 of figure 5) and removing the remaining resist layer (step 518 of figure 5).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 3, 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allee as applied to claims 1, 10 and 19 above, respectively, and further in view of JP 04251853.**

Allee does not teach using a conductive organic material as the strippable film.

JP 04-251853 teaches using a conductive organic material as a resist material for focused ion beam etching.

It would have been obvious to one skilled in the art to use the resist material of JP 04251853 for the resist in the process of Allee because JP 04251853 teaches that by using a conductive resist, the reliability of the focused ion beam etching is improved.

**Claims 4-7, 13-16 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allee as applied to claims 1, 10 and 19 above, respectively, and further in view of JP 01-175232.**

Allee does not teach using a strippable film that consists of an insulating layer and an overlying conductive layer.

JP 01-175232 teaches applying a conductive layer over an insulating masking layer before patterning with an ion beam.

It would have been obvious to one skilled in the art to apply a conductive layer over the insulating resist layers of Allee because JP 01-175232 teaches that the provision of a grounded conducting layer facilitates the dispersal of charge that would otherwise build up on a sample that is undergoing an ion beam treatment. By preventing the build up of charge on the surface of the workpiece, the ion beam does not suffer from coulombic deflection. As a result, the ion beam patterning is more accurate. It would have been obvious to one skilled in the art to use either an organic or an inorganic conductor because the benefit described above is a function of electrical conductivity and not a function of the conductive materials composition. Therefore, the skilled artisan would reasonably expect either an organic or an inorganic conductor to provide the benefit that is taught by JP 01-175232.

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 703-306-9075. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Greg Mills, can be reached on 703-308-1633. The general fax numbers for TC1700 are 703-872-9310 (non-after finals) and 703-872-9311(after-final). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Allan Olsen, Ph.D.  
September 9, 2003

